

Amendment

To: Examiner of the Patent Office

1. Identification of the International Application:
PCT/JP03/09657

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4. Item to be amended: Description and Claims

5. Subject Matter of Amendment:

(1) In the Specification, "a transportation frame 24" on line 18 of page 5 is amended to "a transportation frame 24 that is formed of a rigid body and used only during transportation," "at the construction site of the exhaust heat recovery boiler, the modules 25" on line 1 to 3 of page 6 is amended to "at the

construction site of the exhaust heat recovery boiler, surfaces of each module 25 which will be set perpendicular to the gas flow are set to the upper and lower sides and each module is erected together with the transportation frame 24, each module 25 is extracted from the inside of the transportation frame 24, and the respective modules 25," and "set to the upper and lower sides and the module is temporarily fixed onto a standing jig 37" on line 12 to 14 of the same page is amended to "set to the upper and lower sides and the module is temporarily fixed onto a standing jig 37 that has been set in advance at a construction site," and "by a crane 42" on line 18 of the same page is amended to "by using a crane 42 that has been set up in advance at a construction site." Also, "via first connecting steel plates 36" on line 12 of page 7 is amended to "by using first connecting steel plates 36," "closed by a second steel plate 39" on line 14 to 15 of the same page is amended to "closed by using a second steel plate 39," and "one module unit is composed of a member, including heat exchanger tube panels 23 each composed of a heat exchanger tube bundle 3 and headers 7 and 8 for the heat exchanger tube bundle 3, an upper casing 20 provided above the heat exchanger tube panel 23, and support beams 22 for the heat exchanger tube panel provided on the upper surface of the upper casing 20, and a transportation frame 24 formed of a rigid body enclosing the member" on line 4 to 11 of page 8 is amended to "one module unit is composed of a heat exchanger tube panel module comprising a member, including a heat exchanger tube panel 23 composed of a heat exchanger tube bundle 3 and headers

7 and 8 for the heat exchanger tube bundle 3, an upper casing 20 provided above the heat exchanger tube panel 23, and support beams 22 for the heat exchanger tube panel provided on the upper surface of the upper casing 20, and a transportation frame 24 that houses the module and is used only during transportation and formed of a rigid body."

(2) In Claim 1, "a transportation frame" is amended to "a transportation frame that is formed of a rigid body and used only during transportation," "by suspending each module from above between respective adjacent ceiling part support beams at a construction site of the exhaust heat recovery boiler," is amended to "at a construction site of the exhaust heat recovery boiler, surfaces of each module which will be set perpendicular to the gas flow are set to the upper and lower sides and each module is erected together with the transportation frame, each module is extracted from the inside of the transportation frame, and each module is suspended from above between adjacent ceiling part support beams at a construction site of the exhaust heat recovery boiler, whereby." In Claim 2, "set to the upper and lower sides and each module is temporarily fixed on a standing jig" is amended to "set to the upper and lower sides and the module is temporarily fixed on a standing jig that has been set at a construction site in advance." In Claim 3, "via first connecting steel plates " is amended to "by using first connecting steel plates," and "closed by second steel plates" is amended to "closed by using second steel plates." In Claim 4, "houses the module" is amended

to "houses the module, and is used only during transportation."

6. List of Attached Documents:

- (1) The sheets of page 5-8 (corresponding to the description from page 5 in line 7 to page 9 in line 10 of the translation of the application as originally filed, corresponding to sheets of page 3, 4, and 4/1 of the description filed with the letter of 19 December, 2003.)
- (2) The sheets of page 9-12 (a set of the claims 1 to 7, including the claims 1 to 4 from page 28 in line 1 to page 30 in line 23 of the translation of the application as originally filed, corresponding to sheets of page 14, 15 and 15/1 of the claims 1 to 4 filed with the letter of 19 December, 2003.)

construction method which prevents heat exchanger tube panels from being damaged during transportation, reduces transportation costs simultaneously, and reduces members to be wasted after installation, and heat exchanger tube modules to be used in this method.

DISCLOSURE OF THE INVENTION

The present invention provides a construction method for an exhaust heat recovery boiler which generates steam by arranging a heat exchanger tube bundle 3 within a casing 1 that forms a gas duct for virtually horizontal flows of exhaust gas, wherein modules 25 each of which is obtained by housing a member including heat exchanger tube panels 23 each comprising a heat exchanger tube bundle 3 and headers 7 and 8 of the heat exchanger tube bundle 3, an upper casing 20 provided above the heat exchanger tube panel 23, and support beams 22 for the heat exchanger tube panel provided on the upper surface of the upper casing 20 in a transportation frame 24 that is formed of a rigid body and used only during transportation, are manufactured by a necessary size and number according to design specifications of the exhaust heat recovery boiler, structural members for supporting the modules 25, including ceiling part support beams 33 and 34 and side casings 1a and 1b and a bottom casing 1c of the exhaust heat recovery boiler except for the ceiling part are constructed in advance at a construction site, and at the construction

site of the exhaust heat recovery boiler, surfaces of each module 25 which will be set perpendicular to the gas flow are set to the upper and lower sides and each module is erected together with the transportation frame 24, each module 25 is extracted from the inside of the transportation frame 24, and the respective modules 25 are suspended from above between adjacent ceiling part support beams 33, whereby the heat exchanger tube panel support beams 22 of respective modules 25 are disposed at the set heights of the ceiling part support beams 33 and the support beams 22 and 33 are connected and fixed to each other via connecting steel plates 36, 39, and 40.

In the above-mentioned exhaust heat recovery boiler construction method, at a construction site of the exhaust heat recovery boiler, it is possible that surfaces of each module 25 which will be set perpendicular to the gas flow are set to the upper and lower sides and the module is temporarily fixed onto a standing jig 37 that has been set in advance at a construction site, the standing jig 37 with the respective module 25 placed is propped up so that the lengthwise direction of the standing jig 37 is turned to be vertical at a position adjacent to the side casing 1a or 1b of the exhaust heat recovery boiler by using a crane 42 that has been set up in advance at a construction site, and next, surfaces of the respective module 25 which will be set perpendicular to the gas flow are arranged so as to be parallel with the side casing 1a or 1b of the exhaust heat

recovery boiler and the standing jig 37 is temporarily fixed to the side casing 1a or 1b, and the target to be lifted by the crane 42 is changed into the heat exchanger tube panel support beams 22 of the module 25 placed inside the standing jig 37 temporarily fixed to the side casing 1a or 1b, the module 25 is lifted so as to come off the standing jig 37, and the module 25 lifted by the crane 42 is suspended from above between adjacent ceiling part support beams 33 of the supporting structural members of the exhaust heat recovery boiler.

Furthermore, in the exhaust heat recovery boiler construction method, the following method may be employed in which the heat exchanger tube panel support beams 22 of the modules 25 are set at the set heights of the ceiling part support beams 33 and both support beams 22 and 33 are connected and fixed to each other by using first connecting steel plates 36, and thereafter, a gap created between the upper casing 20 of each module 25 and the ceiling part support beams 33 is closed by using a second steel plate 39, and the upper casing 20, the ceiling part support beams 22, and the second steel plate 39 are connected by means of welding.

Furthermore, it is possible that a heat insulator 13 is provided below the upper casing 20 of each module 25, the upper headers 7 are provided with connecting pipes for circulation of steam or water, and header supports 11 are provided so as to be suspended from the heat exchanger tube

panel support beams 22 between the upper casing 20 and the upper headers 7 of each module 25.

Furthermore, the invention provides heat exchanger tube panel modules 25 for construction of an exhaust heat recovery boiler, wherein one module unit is composed of a heat exchanger tube panel module comprising a member, including a heat exchanger tube panel 23 composed of a heat exchanger tube bundle 3 and headers 7 and 8 for the heat exchanger tube bundle 3, an upper casing 20 provided above the heat exchanger tube panel 23, and support beams 22 for the heat exchanger tube panel provided on the upper surface of the upper casing 20, and a transportation frame 24 that houses the module and is used only during transportation and formed of a rigid body, and the heat exchanger tube panels 23 of the one module unit are provided with vibration isolating supports 18 at predetermined intervals to prevent contact between heat exchanger tubes 6 adjacent to each other in a direction crossing the lengthwise direction of the heat exchanger bundle 3.

In the above-mentioned heat exchanger tube panel module 25, a shake preventive fixing member 32 to be disposed between the end of the vibration isolating support 18 and the transportation frame 24 is provided.

In the invention, in the heat exchanger tube panel module 25 obtained by housing a member including the heat exchanger tube panels 23 each includes the heat exchanger tube bundle